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| 10/800,569 | 03/15/2004 | Hideo Yoshizawa | KON-1859 | 9832 |

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| EXAMINER |
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NOTE, JANIS L

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| ART UNIT | PAPER NUMBER |
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1756

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/800,569

Applicant(s)

YOSHIZAWA ET AL.

Examiner

Janis L. Dote

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-19 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/5/04
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

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1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

In Fig. 1, the reference character **20**. See page 7 of the instant specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The disclosure is objected to because of the following informalities:

(1) The specification at page 6, lines 16-17, states that the "image forming unit 10M for forming a magenta image has a photoreceptor 1Y" (emphasis added). However, the specification previously stated that the photoreceptor 1Y was present in the image forming unit 10Y for forming a yellow image.

(2) The use of trademarks, e.g., Henschel mixer [sic: HENSCHEL MIXER] at page 32, line 19, has been noted in this application. The trademarks should be capitalized wherever they

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appear and be accompanied by the generic terminology. This example is not exhaustive. Applicants should review the entire specification for compliance.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Appropriate correction is required.

3. The examiner has determined that the instant specification has defined the following terms:

(1) The term "average circular degree," i.e., shape coefficient, of the toner is defined at page 16, line 12, to page 17, line 5, of the specification, as the average value of the equation:

shape coefficient = (circumference length of the circle calculated from the circle equivalent diameter of the toner particle)/(circumference length of the projection image of the particle).

(2) The term "surface roughness Ra" recited in instant claim 4 represents a "center line roughness Ra defined in JIS B601 was extended to three dimension so that it can be

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applicable to a measured plane and is 'a value averaging absolute values of a deviation from a standard plane to a specified plane,' being expressed by" the equation disclosed at page 14, line 14, to page 15, line 4, of the instant specification. See the instant specification, page 14, line 8, to page 15, line 4.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 8-11 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 and claims 9-11, which depend from claim 8, are indefinite in the phrase "the cleaning means comprises" (emphasis added) for lack of unambiguous antecedent basis in claim 5, from which claim 8 depends. Claim 5 recites removing the toner that remained on the photoreceptor by "a cleaning device."

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Claim 18 is indefinite in the phrase "forming toner images by individually developing each of the latent images by each of toners" (emphasis added) because it is not clear what is meant by the phrase "each of toners." It is not clear whether "each of the toners" refers different toners. It is also not clear whether "each of the toners" is required to have to the circular degree and to comprise the wax recited in instant claim 1.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C. 103(a).

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8. The reference US 2003/0180646 A1 (Asano) was published on Sep. 25, 2003, prior to the filing date Mar. 15, 2004, of the instant application. Accordingly, Asano qualifies as prior art under 35 U.S.C. 102(a), as well as under 35 U.S.C. 102(e).

9. Claims 1, 2, 4-9, 12-15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano combined with US 2002/0076636 A1 (Uchida).

Asano teaches an image forming method that meets the steps recited in the instant claims but for using the particular toner recited in the instant claims. The Asano method comprises the steps of: (1) developing a latent image on a photoreceptor with a developer comprising a toner; (2) transferring the toner image to a recording medium; (3) fixing the toner image to the recording medium; and (4) removing the toner remaining on the photoreceptor with a cleaning device. Asano further teaches a full color image forming method comprising the steps of:

(1) forming four electrostatic latent images on four photoreceptors, which correspond to a yellow image, a magenta image, a cyan image, and a black image, respectively; (2) developing the four latent images, respectively, with a yellow toner, a magenta toner, a cyan toner, and a black toner; (3) transferring the yellow toner image, the magenta toner image,

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the cyan toner image, and the black toner image from the four photoreceptors to a receiving member; (4) fixing the toner images to the receiving member; and (5) cleaning the toner remaining on each of the four photoreceptors with a cleaning device. Fig. 1; and paragraphs 0048-0051, 0061, and 0371. The photoreceptor comprises a conductive substrate and a surface layer that comprises hydrophobicity treated silica particles having a number average particle size of 45 nm. The surface layer has a surface roughness of 35.6 nm, i.e., 0.0356 μm . See Preparation of Photoreceptor 22 in paragraph 0356 and in Table 6 at page 25, example 8. (Note that the photoreceptor nos. listed in Table 6 should have the numeral "2" before the stated number, e.g., 22 in example 8.) The Asano surface roughness Ra has the same definition as the surface roughness Ra recited in instant claim 4. See Asano, paragraphs 0116-0120 and paragraph 3 supra. The photoreceptor surface layer meets the surface layer limitations recited in instant claims 1, 2, 4, 12, and 19. The cleaning device comprises an elastic rubber cleaning blade **66A** and a brush **66C**. Fig. 5; and paragraphs 0070 and 0077. The cleaning blade **66A** contacts the photoreceptor in a direction counter to the rotating direction of the photoreceptor, as recited in instant claim 7. Paragraph 0072. The brush **66C** comprises fibers having a thickness of 5 to 20 deniers.

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Paragraph 0084. The upper limit of the Asano fiber thickness range of 5 to 20 deniers is within the thickness range 6 to 30 deniers recited in instant claim 9. The Asano fiber thickness range also overlaps the range recited in instant claim 9. The cleaning blade meets the cleaning blade limitations recited in instant claims 6-8. The brush meets the brush limitations recited in instant claim 8 and 9.

As discussed supra, Asano does not disclose the use of the particular toner recited in the instant claims. However, Asano does not limit the type of toner used. Asano, paragraph 0010 and reference claim 1.

Uchida discloses a black toner comprising a colorant, a binder resin, and the ester wax no. 21, pentaerythritol tetrabehenate. The toner has an average circularity of 0.964 with a standard deviation of circularity of 0.031. Ester compound No. 21 at page 3; Latex 1 in Table 1 at page 11; color particles group 1 in Table 2 at page 12 and Table 5 at page 13. The ester wax no. 21 meets the wax limitations recited in instant claims 1 and 15. The Uchida average circularity and standard deviation of circularity fall within the ranges of average circular degree and standard deviation of circular degree recited in instant claims 1 and 13 and in claim 14, respectively. The Uchida average circularity and standard

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deviation of circularity have the same definitions as the average circular degree and standard deviation of the circular degree recited in the instant claims. Uchida, paragraphs 0112-0113 and paragraph 3 supra. Uchida further discloses a yellow toner, a magenta toner, and a cyan toner that meet the toner limitations recited in instant claims 1 and 13-15. According to Uchida, its toner has excellent high fixing characteristics without the occurrence of offset. The toner provides high quality images after long storage. The toner provides stable images for many repeated uses. The toner minimizes the problem of photoreceptor filming and "deformation of image blurring." Paragraph 0005 and Tables 7 and 8, example 1.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Uchida, to use the Uchida toners in the image forming methods disclosed by Asano. That person would have had a reasonable expectation of successfully obtaining image forming methods that provide stable high quality single toner images or stable high quality full color images as taught by Uchida.

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10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Asano combined with Uchida, as applied to claim 8 above, further in view of additional teachings in Asano.

Asano combined with Uchida renders obvious an image forming method as described in paragraph 9 above, which is incorporated herein by reference. As discussed in paragraph 9 above, the Asano cleaning device comprises the brush **66C**. Asano further teaches that the density of brush fibers of the brush is from $4.5 \times 10^2/\text{cm}^2$ to $2.0 \times 10^4/\text{cm}^2$ (number of brush hairs per one square centimeter). Asano, paragraph 0086. The Asano density of brush fibers overlaps the density range of $4.5 \times 10^2/\text{cm}^2$ to $15.5 \times 10^2/\text{cm}^2$ recited in instant claim 10. Asano teaches that if the density of brush fibers is less than $4.5 \times 10^2/\text{cm}^2$, "not only rigidity is low and abrasion pressure is weak but also uneven abrasion is caused, which makes uniform removal of adhered substances impossible." If the density of brush fibers is not less than $2.0 \times 10^4/\text{cm}^2$, the "brush becomes too rigid to increase abrasion pressure which abrade a photoreceptor, resulting in generation of image defects such as fog due to reduced sensitivity and black streaks due to abrasion marks." Paragraph 0086. Thus, the reference appears to recognize that the density of brush fibers is a result-effective variable. The

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variation of a result-effective variable is presumably within the skill of the ordinary worker in the art.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Asano, to adjust, through routine experimentation, the density of the brush fibers in the cleaning brush in the Asano cleaning device, such that the resultant density of the brush fibers is within the density range recited in instant claim 10, and to use the resultant brush in the image forming method rendered obvious over the combined teachings of Asano and Uchida. That person would have had a reasonable expectation of successfully obtaining an image forming method that effectively removes adhered substances from the photoreceptor and that provides toner images without the occurrence of fog and black streaks, as taught by Asano.

11. Claims 1, 2, 5, 6, 12-15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2001/0031417 A1 (Nagase) combined with US 6,300,027 B1 (Chambers), as evidenced by US 5,955,530 (Inoue).

Nagase teaches an image forming method that meets the steps recited in the instant claims but for using the particular photoreceptor recited in the instant claims. The Nagase method comprises the steps of: (1) developing a latent image on a

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photoreceptor with a developer comprising a toner;

(2) transferring the toner image to a recording medium;

(3) fixing the toner image to the recording medium; and

(4) removing the toner remaining on the photoreceptor with a cleaning device. Nagase further teaches a full color image

forming method comprising the steps of: (1) forming four

electrostatic latent images on four photoreceptors, which

correspond to a yellow image, a magenta image, a cyan image, and a black image, respectively; (2) developing the four latent

images, respectively, with a yellow toner, a magenta toner, a

cyan toner, and a black toner; (3) transferring the yellow toner image, the magenta toner image, the cyan toner image, and the

black toner image from the four photoreceptors to a receiving

member; (4) fixing the toner images to the receiving member; and

(5) cleaning the toner remaining on each of the four

photoreceptors with a cleaning device. Figs. 2 and 3; and

paragraphs 0078 and 0084-0093. The cleaning device comprises a

cleaning blade. See Fig. 2. Nagase discloses a black toner

comprising a colorant, a binder resin, and the ester wax no. 19,

pentaerythritol tetrabehenate. The toner has an average

circularity of 0.970 with a standard deviation of circularity

of 0.034. Ester compound No. 19 at page 9; Latex 5 in

paragraph 0281; black toner 5Bk in Table 1 at page 18. The

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ester wax no. 19 meets the wax limitations recited in instant claims 1 and 15. The Nagase average circularity and standard deviation of circularity fall within the ranges of average circular degree and standard deviation of circular degree recited in instant claims 1 and 13 and in claim 14, respectively. The Nagase average circularity and standard deviation of circularity have the same definitions as the average circular degree and standard deviation of the circular degree recited in the instant claims. Nagase, paragraphs 0249-0251 and paragraph 3 supra. Nagase further discloses a yellow toner, a magenta toner, and a cyan toner that meet the toner limitations recited in instant claims 1 and 13-15. Yellow toner 5Y in Table 2 at page 19, magenta toner 5M in Table 3 at page 20, and cyan toner 5C in Table 4 at page 20.

As discussed supra, Nagase does not disclose the use of the particular photoreceptor recited in the instant claims. However, Nagase does not limit the type of toner used. Nagase, paragraphs 0104-0105.

Chambers discloses a low surface energy organic photoreceptor comprising a conductive substrate and a surface layer that comprises uniformly dispersed hydrophobicity treated silica particles associated with the tradename AEROSIL R812S.

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See example 2 at col. 14. Chambers does not disclose the particle size of the silica particles. However, Inoue discloses that hydrophobic silica particles associated with the tradename AEROSIL R812S have a number average particle size of 7 nm. Inoue, col. 3, lines 12-14 and 21-25, and col. 4, lines 26-28. The number average particle size of 7 nm is within the number average particle diameter range of 1 nm to less than 100 nm recited in instant claim 19. Thus, the Chambers photoreceptor surface layer meets the surface layer limitations recited in instant claims 1, 2, 12, and 19. According to Chambers, its photoreceptor having a low surface energy provides the benefits of decreased toner adhesion, improved toner transfer, and increased wear resistance. The photoreceptor has improved cleaning properties and cycling stability. The photoreceptor has a smooth surface free of pores. Col. 3, lines 38-50, and example 2.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Chambers, to use the Chambers photoreceptor in the image forming methods disclosed by Nagase. That person would have had a reasonable expectation of successfully obtaining image forming methods that have improved stability and provides stable images for many repeated runs.

12. Claims 3, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagase combined with Chambers, as evidenced by Inoue, as applied to claim 1 above, further combined with US 6,338,929 B1 (Hagi).

Nagase combined with Chambers, as evidenced by Inoue, renders obvious an image forming method as described in paragraph 11 above, which is incorporated by reference.

Nagase does not disclose that its toner comprises a metal salt of a fatty acid as recited in the instant claims. However, Nagase discloses that the toner may comprise "so-called external additives" for the purpose of "improving fluidity as well as chargeability, and of enhancing cleaning properties" of the toner. Nagase does not limit the type of external additives used. Paragraph 0191.

Hagi teaches toners comprising toner particles and a combination of four particular external additives. The combination of external additives comprises: (1) hydrophobic silica particles having a number-average particle size of 30 nm; (2) titanium oxide particles having a number-average particle size of 50 nm; (3) titanium oxide particles having a number-average particle size of 200 nm; and (4) calcium stearate having a volume average particle size of 5 μ m in an amount of 0.1 wt%

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of the toner. See col. 9, lines 53-68; col. 10, lines 1-14; and Table 1 at col. 11, example 2. The calcium stearate disclosed by Hagi meets the limitations of the fatty acid salt recited in instant claims 3 and 16. The calcium stearate amount of 0.1 wt% of the toner is within the amount range of 0.01 to 10% by weight of the toner recited in instant claim 17. Accordingly to Hagi, when a toner comprises such a combination of external additives, the adhesion and wearability of the surface of the photosensitive material is suppressed, and the toner "exhibits the excellent rising property of the electrification, environmental stability and durability." Col. 2, lines 12-22. Hagi further teaches that by externally adding the fatty acid metal salt, i.e., calcium stearate, to the toner, a "lubricative film is uniformly formed on the surface of the photosensitive member to prevent the adhesion on said surface, and the occurrence of BS [black spots] can be prevented (a lubricating function)." Col. 5, lines 53-57, and Table 3 at col. 13, example 2.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Hagi, to use the combination of the four particular external additives in example 2 of Hagi, which includes calcium stearate in an amount of 0.1 wt% of the toner, as the externally additives in the

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toner in the image forming method rendered obvious over the combined teachings of Nagase and Chambers, as evidenced by Inoue. That person would have had a reasonable expectation of successfully obtaining an image forming method that suppresses the adhesion and wearability of the surface of the photoreceptor, that provides images with stable image density without the occurrence of fog under various environments, and that provides images without the occurrence of fog after many repeated runs, as disclosed by Hagi.

13. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagase combined with Chambers, as evidenced by Inoue, as applied to claim 5 above, further combined with Japanese Patent 09-274417 (JP'417). See the Japanese Patent Office machine assisted translation of JP'417 for cites.

Nagase combined with Chambers, as evidenced by Inoue, renders obvious an image forming method as described in paragraph 11 above, which is incorporated by reference.

Nagase does not disclose the use of a cleaning blade or a cleaning brush as recited in instant claims 6-11. However, as discussed in paragraph 11 above, Nagase discloses that the cleaning device can comprise a cleaning blade. See Fig. 2. Nagase does not limit the type of cleaning device used.

JP'417 discloses a cleaning device for removing toner from an organic photoreceptor. The cleaning device comprises an elastic rubber cleaning blade 5 and a brush 4. JP'417, Fig. 1; and the translation, paragraphs 0013 and 0023. The cleaning blade 5 contacts the photoreceptor in a direction counter to the rotating direction of the photoreceptor, as recited in instant claim 7. Translation, paragraphs 0014 and 0026. The pressure of the cleaning blade 5 to the photoreceptor is from 5 g/cm to 30 g/cm. Translation, paragraphs 0013 and 0023. The brush 5 comprises fibers having a thickness of 6 to 30 deniers. The density of brush fibers is from $4.5 \times 10^2 \text{ f/cm}^2$ to $15.5.0 \times 10^2 \text{ f/cm}^2$. Translation, paragraphs 0017-0019. The cleaning blade 5 meets the cleaning blade limitations recited in instant claims 6-8 and 11. The brush 4 meets the brush limitations recited in instant claim 8-10. According to JP'417, when its cleaning device is used in an image forming method, the cleaning device effectively removes the toner remaining on the photoreceptor without damaging the surface of the photoreceptor and decreasing the wear of the photoreceptor. Translation, paragraphs 0017 and 0025. The image forming method provides good quality images, e.g., up to 200,000 copies, for a long period of time. Paragraphs 0011, 0076, and 0077. JP'417 further discloses that when its cleaning device is not used in

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the image forming method, the image quality deteriorates after many repeated runs. Paragraph 0078, and Table 1, comparison examples 1-7.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of JP'417, to use the JP'417 cleaning device as the cleaning device in the image forming method rendered obvious over the combined teachings of Nagase and Chambers, as evidenced by Inoue. That person would have had a reasonable expectation of successfully obtaining an image forming method that effectively removes toner remaining on the surface of the photoreceptor and that provides good quality images, e.g., up to 200,000 copies, for a long period of time, as taught by JP'417.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (571) 273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through

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JLD
Sep. 23, 2005

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